PEMS Legacy Barcode Documentation

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APPENDIX A
BAR CODE APPLICATIONS

To facilitate speed, accuracy and quality of data collection on the PEMS, bar code devices (printers and readers) are used in various activities.

1. BAR CODE APPLICATIONS

The objective of the PEMS Bar Code Applications is to facilitate the timely and accurate collection of project data.

The purpose of this document is to provide guidance in the operation and maintenance of bar coding equipment utilized on the project.

1.1 REFERENCES

A. Environmental Restoration Quality Assurance Program Plan, ES\ER\TM-4.

B. PEMS Configuration Control Plan

C. Series 3300 System Administration Manual by Symbol Technologies, Inc., Costa Mesa, California (Document No. 59040-00-90), Version 2.1, September 1992)

D. PDT 3300 Operator's Guide by Symbol Technologies, Inc., Costa Mesa, California (Part No. 59040-00-89, Version 1.02)

E. Series 3800 System Administration Manual by Symbol Technologies, Inc., Costa Mesa, California (Document No. 59042-00-90), Version 2.0, September 1992)

F. Series 3800 Portable Terminals User's Guide by Symbol Technologies, Inc., Costa Mesa, California (Part No.58694-00-82, Version 1.0)

G. Series 3000 Application Programmer's Manual, Part I and II, version 1.3, January 1993, Part III, version 1.2, February 1992, Symbol Technologies Inc., Costa Mesa, California

H. Programmer's Guide Series 3000 Terminal Application Developer's Library, Symbol Technologies Inc., Costa Mesa, California, version 2.3, October 1992

I. Programmer's Implementation Manual Series 3000 Portable Terminals, Symbol Technologies, Inc., version 1.3, September 1992

J. 4100 Bar Code Label Printer User's Manual by Intermec Corporation, Everett, Washington, Part Number 057713 Revision A, 1992.

K. Loftware Label Manager Plus by Loftware, Inc., New Beach, Maine

L. Microsoft C Reference, Microsoft Corporation

1.2 DEFINITIONS

ASCII: American Standard Code for Information Interchange. An International Standards Organization 7-bit character set established by the American National Standards Institute designed to achieve compatibility among data services.

Bar Code: A graphic representation of numeric or alphanumeric data in the form of variable-width bars and spaces. The bar code industry uses the term Symbology to denote each particular bar code scheme, whereas the term symbol refers to the bar code label itself.

Bar Code Reader: A device which reads data encoded in a bar code.

Code 39: A bar code scheme of three wide elements out of a total of 9: five bars with four spaces between them. Code 39 has code words for the 10 digits (0-9), the 26 letters (A-Z) and eight special symbols: hyphen (-), period (.), space ( ), asterisk (*), dollar ($), slash (/), and percent (%).

DB-25: The COM1 serial port located at the bottom of the PDT 3300 bar code reader under the end cap. The 25-pin connector used as a communications port for transferring data from the reader.

Keying: Typing in data values using the key pad and pressing the **Enter** key.

LCD: Liquid Crystal Display. Displays various alphanumeric, graphic, or sketch results. The LCD can display as many as eight lines of 20 characters per line.

Menu sheet: A sheet of bar code labels which may be scanned in response to a bar code reader prompt.

Pivotal prompt: A prompt with multiple correct responses including function keys which may reroute the data flow, exit the transaction, display data, or review data.

Scanning: The movement of a wand over a bar code label for the purpose of decoding. Also, a laser gun can work as a scanner using the point and shoot motion.

Transaction: The prompts from the bar code reader program and the expected responses for the data collection activity.

Transaction type: The type of data that will be collected.

Transaction flow chart: A flow chart prepared for a specific transaction to show the user the prompts and the flow order of how the information will be collected. The word "scan" may be used for either scanning or keying information.

Upload: To transfer data or files from the PDT 3300 or LDT 3805 bar code readers to a host computer by way of a RS-232-C communication line.

Wand: A portable device that contains a photoelectric cell and is used to scan bar code labels. A device that can read data encoded in the bar code label and produce a digitized pattern that corresponds to the bars and spaces of the bar code scheme.

1.3 PROGRAMMING SUPPORT

To obtain programming support for PEMS Bar Code applications, contact

PEMS Support (pems@ettp.doe.gov)

2. GENERAL

Bar code readers will be used to read bar code labels for various activities within PEMS. Only Code 39 bar code labels will be used. Both Portable Data Terminal (PDT) 3300 and Laser Data Terminal (LDT) 3805 will be used to collect and transmit bar code data. The bar code readers will be programmed in Microsoft C, version 6.00. Programs will be written for each data collection activity. The data collected by the bar code reader is stored in an ASCII file. From the bar code reader the ASCII file is downloaded to a personal computer and then transferred to the workstation for further data processing.

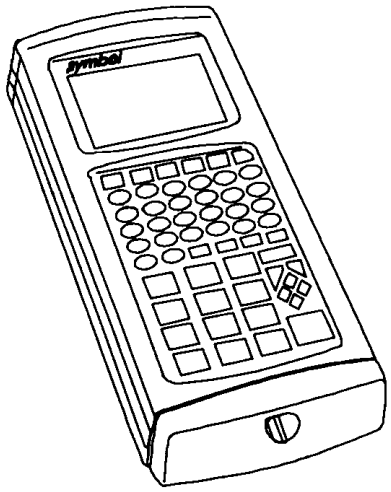


Fig. A-1 Portable Data Terminal (PDT) 3300.

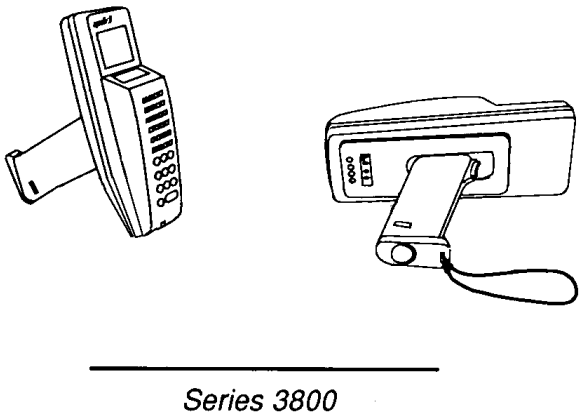


Fig. A-2 Laser Data Terminal (LDT) 3805.

2.1 RESPONSIBILITIES

Effective utilization and operation of bar coding activities requires the identification of responsibilities for individuals involved in the process. The following figure depicts the responsible individuals, flow of activities and their interrelationships.

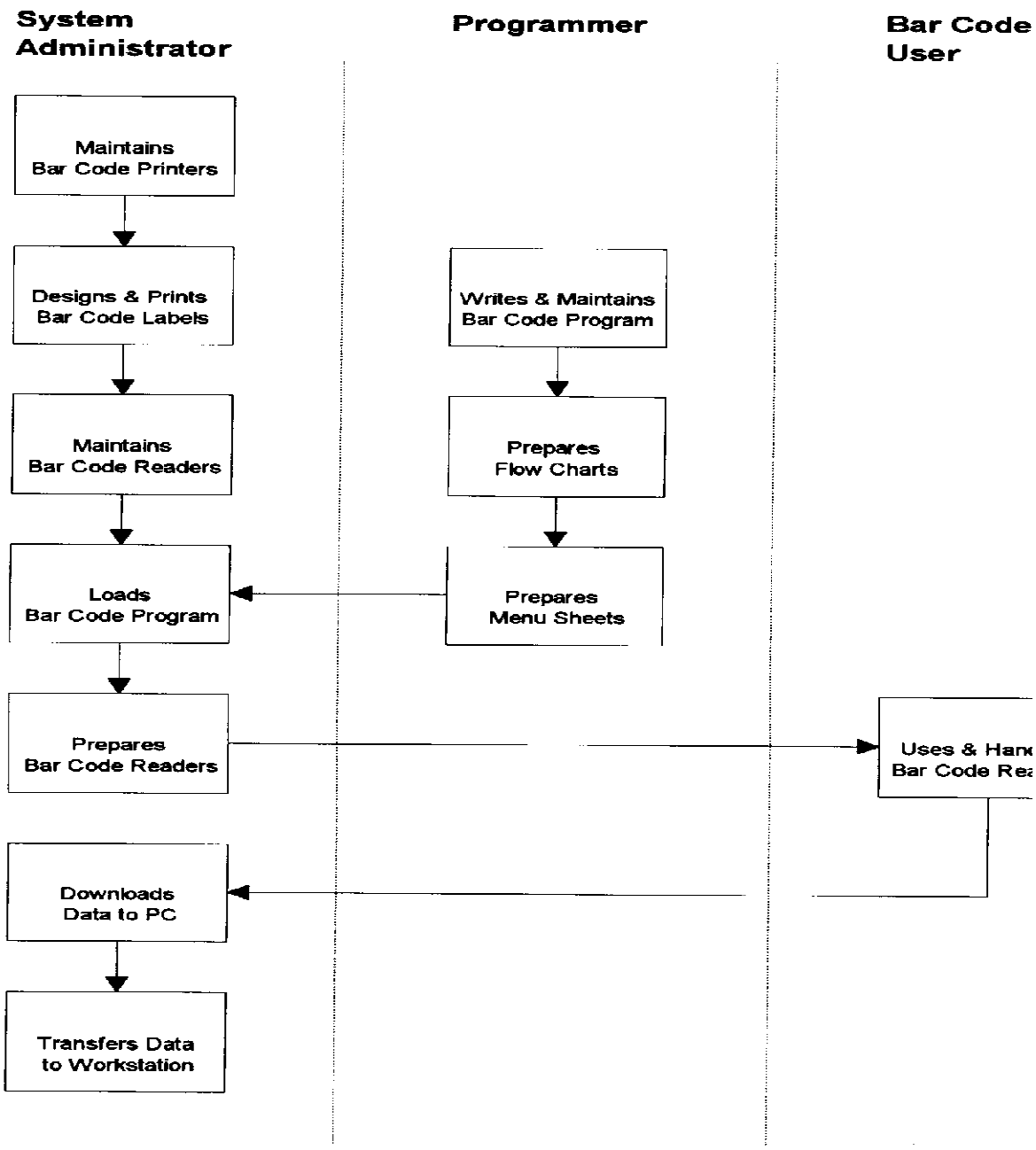


Fig. A-3 Responsibility Matrix and Process Flow.

The following sections describe the bar code related activities associated with each of the responsible individuals.

2.2 SYSTEM ADMINISTRATOR

The System Administrator is responsible for maintaining the bar code printers, designing and printing bar code labels, maintaining the bar code readers, loading C programs into the bar code readers, preparing bar code readers for data collection, downloading bar code reader data files to a PC and transferring those files to the PEMS workstation.

2.2.1 Intermec 4100 Label Printer Maintenance

This section describes how to maintain the Intermec 4100 Bar Code Printer and describes how to load labels, load thermal transfer ribbons, and change thermal transfer ribbons in the printer. The following equipment is required: roll of labels, thermal transfer ribbon, and Intermec 4100 Bar Code Label Printer.

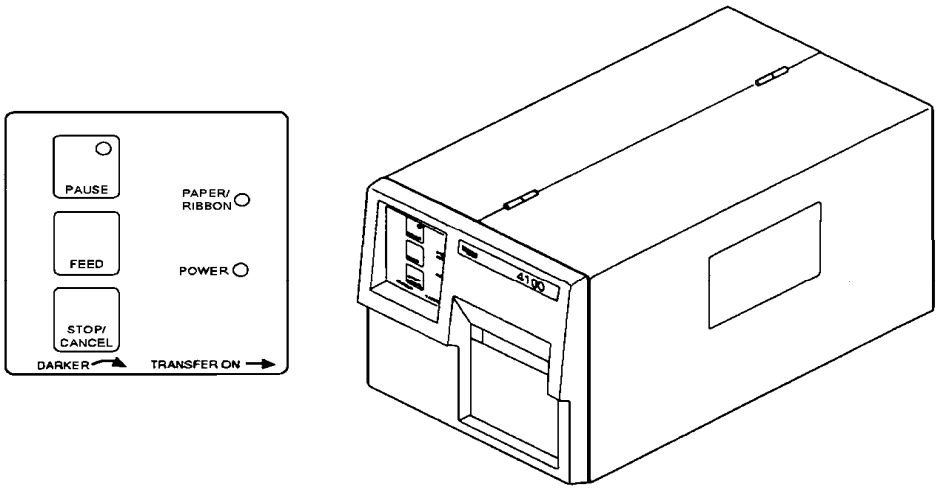


Fig. A-4 Intermec 4100 Bar Code Printer.

2.2.1.1 Maintaining the Bar Code Printer

The 4100 printer is designed to withstand harsh environments, but it should be cleaned on a regular basis to keep it running at full capacity. Cleaning and routine maintenance will be performed in accordance with Chapter 5 of the 4100 Bar Code Label Printer Users' Manual.

WARNING: ALWAYS TURN OFF THE PRINTER'S POWER BEFORE PERFORMING MAINTENANCE. Read the safety precautions listed on page 60 of the 4100 Bar code Label Printers User's Manual before cleaning or repairing the printer.

2.2.1.2 Loading Labels

Label loading is accomplished through the following steps:

A. Open the right side cover and front panel cover.

Λ Additional information can be found on the diagram inside the Intermec 4100.

B. Rotate the head lift lever (with orange covering) clockwise to the UP position to disengage the print head.(See figure on page 19 of 4100 Bar Code Printer User's Manual).

C. Slide the retainer to the outer end of the supply mount and flip the supply roll retainer down.

D. Place the label roll on the supply roll hanger with the labels facing up.

E. Flip the supply roll retainer to the upright position and slide it back firmly against the roll of labels.

F. Rotate the labels until you have about 18" of loose labels.

G. Flip the label adjust guide DOWN and feed the loose labels through the media guide.

H. Insert the loose stock through the print head. Make sure the label passes between the two forks of the label gap sensor, and that the front edge of the label passes over the tear-off plate and through the label dispense opening in the front cover. (See figure on page 8 of 4100 Bar Code Printer User's Manual).

I. Rotate the label adjust guide UP and slide it to the edge of the loose labels.

J. Rotate the head lift lever counterclockwise to the DOWN position to engage the print head.

K. Press the **FEED** button on the front panel cover to advance several inches of labels through the bar code printer label opening in the front cover.

L. Close the right side cover and front panel cover of the printer. The labels are now loaded.

2.2.1.3 Loading the Ribbon

A. Repeat steps A and B in section 2.2.1.2 above.

B. Remove the ribbon clasp from the ribbon re-winder.

C. Slide the roll of ribbon onto the ribbon supply hub so that you can pull the leading edge of the ribbon counterclockwise off the top of the roll. (See figure at page 56 of 4100 Bar Code Printer User's Manual).

D. Route the ribbon through the print head as illustrated on the diagram inside the printer. (Also see figure at page 56 of 4100 Bar Code Printer User's Manual). Make sure the ribbon runs between the two edges of the black ribbon guide located behind the print head. The shiny side of the ribbon must come in contact with the print head. DO NOT thread the ribbon between the two forks of the label gap sensor.

E. Wind a few inches of ribbon onto the ribbon re-winder or ribbon core in a counterclockwise direction.

F. Slide the ribbon clasp over the ribbon and onto the ribbon re-winder.

G. Rotate the head lift lever counterclockwise to the DOWN position to engage the print head.

H. Close the right side cover and front panel cover of the printer. The bar code printer is now ready to print.

2.2.1.4 Changing the Ribbon

A. Repeat steps A and B in section 2.2.1.2 above.

B. Slide the used ribbon and ribbon clasp from the ribbon re-winder and slide the empty ribbon core from the ribbon supply hub.

C. Put the empty ribbon core on the ribbon rewind hub and the roll of ribbon on the ribbon supply hub. (See figure at page 14 of 4100 Bar Code Label Printer User's Manual).

D. Repeat steps C, D, E, F, G and H in section 2.2.1.3 above.

2.2.2 Designing and Printing Bar Code Labels

Bar code labels for the PEMS project will be designed using the Loftware Label Manager (LLM) software on personal computers. This section will describe how to design and print bar code labels using the Loftware Label Manager Software and the Intermec 4100 Bar Code Label Printer.

2.2.2.1 Designing Bar Code Labels

A. To use LLM, change the directory to the LLM subdirectory by typing CD\LLM and press the **Enter** key. The prompt should be C:\LLM>. Then type LLM and press the **Enter** key twice together.

B. The LLM Main Menu will appear on the computer screen. Press the **F2** key for Label Design or use the mouse to click (press the left mouse button one time) on the F2 icon. The Load Label from Disk box will appear with F10-Accept, Directory, and Cancel. To create a new label, press the **Esc** key or use the mouse to click on Cancel, then the Create New Label box will appear. You will need to press the **Esc** key one more time for Cancel or use the mouse to click on Cancel. The form layout template appears on the screen with only the border highlighted.

C. Use the mouse and click on the bar code icon or press the **Alt** key and the **B** key together (**Alt-B**), then move the mouse to the drawing board where you want the bar code label. Then press the left mouse button. The Bar Code Field box will appear on the screen. The Data Source field should be Variable. Move the mouse to Field Name and click or press the **Tab** key one time. The field name must be six characters in length. Press the **Backspace** key and type the field name (i.e. EQUPNO). Then press the **Tab** key or move the mouse to the Height field and click. In the Height field press the **Backspace** key and type .38 and press the **Tab** key. The Max Length field should be 09 ; the Symbology field should be Code 39; and the Interpretive field should be Enable. If these fields are not set right, change them now. When all fields are correct, press the **F10** key to accept or click F10-Accept.

D. Press **Alt-S** for Select and a pointer will appear on the screen. Press the **Up** arrow key or **Down** arrow key until the pointer points at the text on the screen, then press the **Enter** key. Next press **Alt-C** for Change, then the Interpretive Field box will appear. In the Interpretive Field box the Font Field should be highlighted. Use the **Up** arrow key or **Down** arrow key until the font is F: 20 point , then press the **F10** key to accept or click on F10-Accept.

E. Use the mouse and click on the Move icon or press **Alt-M**. Then move the mouse up until the text is at the top of the Drawing Board over the bar code label. Then press the left mouse button again or press the **Enter** key. If the text and bar code overlap you will need to move the bar code label down.

F. To save the design label and exit the Drawing Board, press the **F10** key and then type the file name (i.e. EQUIPMENT). Next press the **F10** key or click on the F10-Accept icon. To exit the Drawing Board Label Design press **Alt-Q**. The LLM Main Menu should appear on the screen.

G. Presently there are four different bar code labels in use They are:

1. Sample ID Label. This bar code label is affixed to the sample container and identifies the sample.

   format: xnnnnn
   where: x= Unique for each project
   nnnnn=00001-99999

2. Equipment ID Label. This bar code label is affixed to equipment and identifies that equipment.

   format: EQUIPnnnn
   where: nnnn=0001-9999

3. Multi-purpose Label. This bar code label is used for various representations to include FCOC number, logbook number and document control number.

   format: xxxxnnnnnn
   where: x= Unique for each project
   nnnnnn=000001-999999

4. Sample Label. This oversized label contains the sample ID bar code label. It is affixed to the sample container and contains information about the sample (See Figure for FCOC Sample Label).

2.2.2.2 Printing Bar Code Labels

Bar code labels for the PEMS project will be printed using the Loftware Label Manager (LLM) software on personal computers. To use LLM, change directory to the LLM subdirectory by typing CD\LLM and press the **Enter** key. The prompt should be C:\LLM>. Then type LLM and press the **Enter** key twice together.

The LLM Main Menu will appear on the computer screen. Press the **F3** key for Label Production or click on the F3 icon with the mouse left button. The LLM Label Production Mode menu will appear on the screen with L for Label printing, F for Forms setup, C for Configuration, D for Database mode, press **F1** for Help, and **Esc** for Quit.

Forms Setup. Perform the following steps to setup forms:

A. Press **F** for Forms Setup, and the Form Setup Create/Edit Mode screen will appear. If the Current Label Format field is not the filename of the label you wish to print, press the **F6** key for Label Format Directory. Then the Label Format File Directory screen will appear on the screen. Use the **Up** and **Down** arrow keys to highlight the filename you want to use and press

the **Enter** key. You are now back to the Form Setup Create/Edit Mode Screen with the correct filename in the Current Label Format field.

B. Press **W** for Without a database and the Field Attribute screen will appear. Press the **F7** key for Non-printing and Add/Delete Non-printing Field Screen will appear. Press **1** and type a field name; it must be 6 characters long, i.e. EQUPNO; then press the **Enter** key. Next enter the length, i.e. 06 and press the **Enter** key. Then press the **F10** key to save and exit, this will return you to Field Attribute Setup screen, but now there are two fields on the screen.

C. For serial file setup and use of serial numbers see the Configuration Section below.

D. Press the **Down** arrow key to move the cursor down to the second field, then press the **F2** key for Prompt and type the prompt text to be displayed to the user, i.e. STARTING VALUE: and press the **Enter** key. Next press the **F5** key for Data Source and use the **Up** and **Down** arrow keys until Field Data Source field is Increment, then press **Enter** key.

E. Press the **Up** arrow key to the first field, then press the **F5** key for Data Source. Use the **Up** and **Down** arrow keys until the Field Data Source field is Combine, then press the **Enter** key. The Combine or Concatenated Field Setup screen then will appear on the screen, press **1** and type **FIXFIL1** and press the **Enter** key. The cursor will move to the FIXFIL1 field. Type the fixed value of the label, i.e. EQUIP and press the **Enter** key. Press **2** and type the variable value of the label, i.e. EQUPNO and press the **Enter** key. Then press the **F10** key to Save and exit the Combine or Concatenated Field Setup screen. Press the **Esc** key to Quit and this returns you to the LLM Label Production Mode Menu. Press the **Esc** key again to Quit the Label Production screen, if you are not going to print labels at this time.

Configuration. From the LLM Label Production Mode screen press **C** for Configuration. The Label Production Mode Configuration menu will appear. Please use only S for Setup Serial Number Files and U for qUantity (default) on this menu. Press the **S** key for Setup Serial Number Files and the Serial Number Setup screen will appear. Press **F** for Filename and type any 8 character name to use with this label. Press the **L** key for Length and enter the length of the serial number field only. Next press the **M** key for Mode until Numeric Only appears. Press the **S** key for Starting Value, then type the starting number you want to start with and press the **Enter** key. Last press the **F10** key to Accept and Save this setup. Then press the **Esc** key to Quit and exit. From the LLM Production Mode menu press the **F** key for Forms Setup and everything is the same for Increment. Make it Serial # then press the **Enter** key. Press **F** for File Name until the filename you need appears on the screen.

Printing Labels Only. Perform the following steps to print labels only:

A. From the LLM Main Menu press the **F3** key for Label Production. Press **F** for Form Setup and the Create/Edit Mode screen will appear. If the label you want to print does not appear in the Current Label Format field, press the **F6** key and the labels directory will appear on the screen. Using the **Up** and **Down** arrow keys to highlight the label you want to print and press the **Enter** key. Next press the **Esc** key to Quit the Form Setup screen and that will return you to the LLM Label Production Mode menu.

B. At the LLM Label Production Mode menu press the **L** for Label Printing. Type in the Starting Number you want the label to start with i.e. 005099 and press the **Enter** key. Next press the **F2** key for Quantity of Labels and type the number of labels needed i.e. 20. Press the **Enter**

key. Last press the **F9** key for Print; this will print the number of labels requested starting with the Starting Number.

Λ Do not print more than 50 labels at one time. For instance if you need 100 labels, print 50 as described and then simply press the **F9** key again and another 50 will print. This second printing will begin at the last number incremented from the first printing.

C. Press the **Esc** to Quit the LLM On-Demand Printing Mode screen and return to the LLM Label Production Mode menu. Press the **Esc** key again to exit and return to the LLM Main menu. To exit Loftware press the **F10** key or click on F10 icon. Then CD \ to return to the root directory.

D. The Label Printing Tracking form will be used to assure that duplication of bar code numbers does not occur.

PEMS
LABEL PRINTING TRACKING

LABEL TYPE:_____

DATE PRINTED	BEGINNING NUMBER	ENDING NUMBER	DATE PRINTED	BEGINNING NUMBER	ENDING NUMBER

COMMENTS_____
_____

Fig. A-5 Label Printing Tracking Form.

2.2.3 Bar Code Reader Maintenance

The Bar Code Maintenance Checklist should be updated every time maintenance is performed. The bar code reader number, maintenance action, and date/time will be filled in along with the person's initials performing the maintenance action. All completed Bar Code Maintenance Checklists will be forwarded to the Document Management Center (DMC).

Maintenance Checklist					
Bar Code Reader #	Primary (NiCad) Battery Changed	Backup Battery Replaced	Program Version	Date/ Time Checked	Initials

Fig. A-6 Maintenance Checklist.

2.2.3.1 Cleaning

The PDT 3300 and LDT 3805 require a minimum amount of maintenance. Proper use and care will increase their life. Cleaning should be done as needed. To clean the bar code reader, use a clean soft cloth dampened with a mild cleaner such a soap and water.

CAUTION: DO NOT POUR, SPRAY OR SPILL ANY LIQUID ONTO ANY PART OF THE BAR CODE READER OR WAND.

2.2.3.2 Battery Charging

This section describes the process for charging the batteries of the PDT 3300 or LDT 3805 bar code reader.

PDT 3300 Bar Code Reader. The NiCad battery will be charged after a day of use. Spare NiCad batteries are kept with the Bar Code Reader System Administrator. The universal battery charger will be used to charge the NiCad battery packs used in the PDT 3300. It is set up as follows:

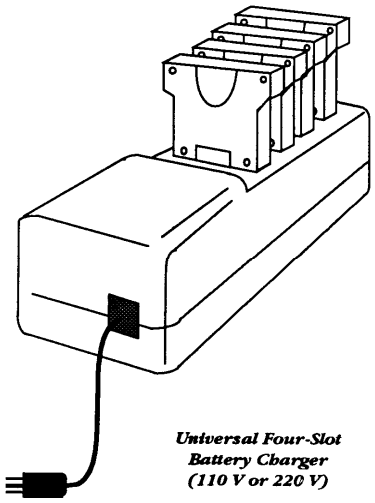


Fig. A-7 Universal Battery Charger.

A. Plug the 110-Volt power cable into a wall 110-Volt outlet.

B. The red and green lights on top of the batteries charger should be positioned to the front where they can be seen.

C. The lights are situated from right to left: green to red. To the left of the red lights are the discharge buttons.

D. Open one of the four loading adapters located on the top of the universal battery charger by pulling the cover up.

E. Slide the NiCad battery into the loading adapter with the plus (+) to the front of the loading adapter.

F Close the cover of the loading adapter. It will snap into place.

G. Start the discharge process by pressing and holding the discharge button (left of the red light) for about three seconds. The red light will blink indicating discharging is taking place.

Λ Discharging may take up to two hours. Charging will start automatically after discharging is finished.

H. Charging will take up to 8 hours. The green blinking light indicates charging is taking place.

I. When charging is complete, the red and green lights will stay on continuously. Open the top of the loading adapter and remove the NiCad battery. The battery is now ready for use.

Indicator Lights:

Blinking Green	Charging
Blinking Red	Discharging
Solid Red and Green	Battery fully charged
Solid Red	No battery installed, bad battery or bad adapter

J. Unplug the battery charger

LDT 3805 Bar Code Reader. The NiCad battery will be charged after a day of use. Spare NiCad batteries are kept with the Bar Code Reader System Administrator. The cradle base module will be used to charge the NiCad battery packs used in the LDT 3805. It is set up as follows:

A. Connect the power supply cord with the round plug to the power connector on the side of the cradle.

B. Plug the 110-Volt power cable into a wall 110-Volt outlet.

C. The red and green indicators light for about 3 seconds, blink for 3 seconds, and then go out.

D. Fit the bottom of the bar code reader into the bottom of the cradle slot.

E. Push the top of the bar code reader against the back of the cradle.

F. The green charging indicator lights and the terminal is turned on.

G. The bar code reader must be left in the cradle up to 8 hours to recharge a fully discharged battery.

CAUTION: DO NOT CHARGE IF BATTERY TEMPERATURE IS BELOW 0EC (32EF). IF BELOW 0EC, WAIT TWO HOURS FOR THE BATTERY TO WARM UP. The green blinking light indicates charging is taking place.

H. When charging is complete, the green light will stay on continuously.

Indicator Lights:

Blinking Green	Fast Charging
Solid Green	Charged; Continues to trickle charge

2.2.3.3 Replacing Batteries

This section describes the process for replacing the backup batteries of the PDT 3300 or LDT 3805 bar code reader.

PDT 3300 Bar Code Reader. The lithium batteries should be replaced about once a year. Before replacing the lithium batteries, it is recommended that you download any data files first.

CAUTION: WHEN BOTH THE MAIN AND BACKUP BATTERIES ARE REMOVED AT THE SAME TIME, THE CONTENTS OF THE DATA FILES ARE LOST.

A. Open the battery cover on the back side of the bar code reader.

B. Remove the lithium batteries by pulling on the plastic ribbons until the batteries come out.

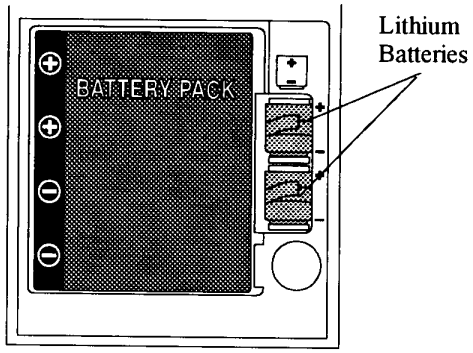


Fig. A-8 Battery Pack.

CAUTION: Dispose of dead lithium batteries in accordance with LMES hazardous material disposal requirements.

C. Insert two new lithium batteries into the empty sockets with the ribbons pointing out.

D. The lithium batteries must be installed with the plus (+) and minus (-) signs in the correct position. Follow the diagram found in the battery compartment. The batteries must be installed with correct polarity for the system to operate.

LDT 3805 Bar Code Reader. The LDT 3805 bar code reader has no lithium batteries to be replaced.

2.2.4 Loading C Programs into the Bar Code Readers

This section describes the process for loading a C Program into the PDT 3300 or LDT 3805 bar code reader. This process must be done after any changes to the C program and before the bar code reader is used in the field.

2.2.4.1 PDT 3300 C Program Loading

Equipment required for program loading includes:

- PDT 3300 Bar Code Reader
- Null Modem Cable
- Personal Computer (PC)
- AC Power Supply Cable

Program loading is accomplished by the following steps:

A. The bar code reader number, program version number, and date should be filled in at this time on the Maintenance Checklist before proceeding.

B. Ensure that the bar code reader is turned off and the end cap is removed.

C. Ensure that the 12-Volt end of the AC power supply cable is plugged into the bar code reader and the 110-Volt end is plugged into a wall outlet. Ensure the male end of the null modem cable is plugged is inserted into the DB-25 port of the bar code reader and the female end into the COM1 port of the PC.

D. Press and hold the letter **A** key and the letter **D** key on the bar code reader simultaneously.

E. While holding these keys down, press and release the **ON/OFF** key.

F. Release the letter **A** and the letter **D** keys. The bar code reader screen will display:

COMMAND MODE

Select function
Self Test

To exit the command mode at any time, press the **CLEAR** key.

G. Press the **Down** arrow key once. This will change Self Test to Program Loader on the bar code reader display.

H. Press the **Enter** key. This will select the Program Loader. The bar code reader screen will display:

Program Loader
WARNING EEPROM
WILL BE ERASED
CONTINUE? <ENT>

I. Press the **Enter** key. This action will erase the Electrically Erasable Programmable Read Only Memory (EEPROM) a Non-Volatile Memory (NVM) and takes about 1 minute. This must be erased before loading the new program.

J. After the NVM is erased, press the **Up** arrow key once. This action will select the 19200 baud rate. Press the **Enter** key.

K. Press the **Enter** key to select 7 bits.

L. Press the **Enter** key to select Odd Parity.

M. Press the **Enter** key to select None on Flow Control.

N. The HEX file, PEMS.HEX, which includes all the necessary files for booting and executing the C program on the bar code reader will be provided by Programming Support

O. On the PC, download the PEMS.HEX file to the bar code reader by executing the SENDHEX utility. Type SENDHEX PEMS 19200 without commas. Press the **Enter** key on the PC.

P. The PC will then display: Press **Enter** to start data communication. Press the **Enter** key on the bar code reader, then the **Enter** key on the PC. The bar code reader will display: Line 1-

Program Loader and Line 2- Receiving: XXXX. XXXX is the program download address. After the program download is completed, the bar code reader displays: Line 1-Program Loader and Line 2-Status 0000. The status should be four zeroes.

Q. On the bar code reader, press and hold down the **ON/OFF**, **F1**, **F4** and **Enter** keys simultaneously.

R. While holding down all four keys, release the **ON/OFF** key.

S. Release the **F1**, **F4** and **Enter** keys. The bar code reader will boot to the C: prompt.

T. Type PEMS and press the **Enter** key. The PEMS program will start.

U. Check the date and time on the bar code reader by using the Date Test (DT) transaction and record the time and the initials of the person loading the program on the bar code reader, on the Maintenance Checklist form. Completed Bar Code Maintenance Checklists will be forwarded to the Document Management Center (DMC).

2.2.4.2 LDT 3805 C Program Loading

Equipment required for program loading includes:

- LDT 3805 Bar Code Reader
- Cradle Base Module 3866
- Null Modem Cable
- Personal Computer (PC)
- AC Power Supply Cable

Program loading is accomplished by the following steps:

A. The bar code reader number, program version number, and date should be filled in at this time on the Maintenance Checklist before proceeding.

B. Ensure that the bar code reader is turned off. Place the bar code reader into the cradle base module.

C. Ensure that the 12-Volt end of the AC power supply cable is plugged into the cradle module and the 110-Volt end is plugged into a wall outlet. Ensure the male end of the null modem cable is plugged is inserted into the cradle module and the female end into the COM1 port of the PC.

D. Press and hold the letter **F** key and the letter **I** key on the bar code reader simultaneously.

E. While holding these keys down, press and release the **PWR** key.

F. Release the letter **F** and the letter **I** keys. The bar code reader screen will display:

COMMAND MODE

Select function
Self Test

^ To exit the command mode at any time, press the **CLR** key.

G. Press the **Down** arrow key once. This will change Self Test to Program Loader on the bar code reader display.

H. Press the **Enter** key. This will select the Program Loader. The bar code reader screen will display:

Program Loader
WARNING EEPROM
WILL BE ERASED
CONTINUE? <ENT>

I. Press the **Enter** key. This action will erase the Electrically Erasable Programmable Read Only Memory (EEPROM) a Non-Volatile Memory (NVM) and takes about 1 minute. This must be erased before loading the new program.

J. After the NVM is erased, press the **Up** arrow key once. This action will select the 19200 baud rate. Press the **Enter** key.

K. Press the **Enter** key to select 7 bits.

L. Press the **Enter** key to select Odd Parity.

M. Press the **Enter** key to select None on Flow Control.

N. The HEX file, PEMS.HEX, which includes all the necessary files for booting and executing the C program on the bar code reader will be provided by Programming Support.

O. On the PC, download the PEMS.HEX file to the bar code reader by executing the SENDHEX utility. Type SENDHEX PEMS 19200 without commas. Press the **Enter** key on the PC.

P. The PC will then display: Press **Enter** to start data communication. Press the **Enter** key on the bar code reader, then the **Enter** key on the PC. The bar code reader will display: Line 1-Program Loader and Line 2- Receiving: XXXX. XXXX is the program download address. After the program download is completed, the bar code reader displays: Line 1-Program Loader and Line 2-Status 0000. The status should be four zeroes. If status code is not zeroes, contact programming support.

Q. Remove the bar code reader from the cradle module. This turns the bar code reader off. If on, turn it off.

R. On the bar code reader, press and hold down the **4** and **5** keys.

S. While holding down these keys, press and release the **PWR** key.

T. Release the **4** and **5** keys. The bar code reader will boot to the C: prompt.

U. Type PEMS and press the **Enter** key. The PEMS program will start.

V. Check the date and time on the bar code reader by using the Date Test (DT) transaction and record the time and the initials of the person loading the program on the bar code reader, on the Maintenance Checklist form. Completed Bar Code Maintenance Checklists will be forwarded to the Document Management Center (DMC).

2.2.5 Preparing Bar Code Readers for Data Collection

This section details the steps for deleting data files from the bar code reader and starting the C program. The System Administrator performs these tasks after downloading the data file from the bar code reader and before the bar code reader is given back to the user.

2.2.5.1 PDT 3300 Bar Code Reader

Preparing the reader for data collection is accomplished as follows:

A. If the bar code reader display is blank, press the **ON/OFF** key. The display should be: D:\>. If this prompt does not appear, turn the bar code reader off. Then while holding down the **Shift** and letter **L** keys, turn the bar code reader on. Release the **Shift** and letter **L** keys. The display should be: D:\>. If display is still incorrect, replace the bar code reader and notify programming support of the problem.

B. At the D:\> prompt, type DEL *.DAT and press the **Enter** key. This deletes all data files from the bar code reader.

C. To restart the PEMS project program on the bar code reader, type PEMS and press the **Enter** key. The bar code reader will display the following:

Version: current version
Date: current date
By: author
Bar code Reader#
#######

D. Key in the appropriate bar code reader numbers. The bar code reader will then display the following:

Transaction Type
##

E. This display indicates that the bar code reader is ready to use. If this display is not correct, see section 2.2.5 for Loading the C Program into the Bar Code Reader.

2.2.5.2 LDT 3805 Bar Code Reader

Preparing the reader for data collection is accomplished as follows:

A. If the bar code reader display is blank, press the **PWR** key. The display should be: D:\>. If this prompt does not appear, turn the bar code reader off. Then while holding down the **4** and **5** keys, turn the bar code reader on. Release the **4** and **5** keys. The display should be: D:\>. If display is still incorrect, replace the bar code reader and notify programming support of the problem.

B. At the D:\> prompt, type DEL *.DAT and press the **Enter** key. This deletes all data files from the bar code reader.

C. To restart the PEMS project program on the bar code reader, type PEMS and press the **Enter** key. The bar code reader will display the following:

Version: current version
Date: current date
By: author
Bar code Reader#
#######

D. Key in the bar code reader numbers. The bar code reader will then display the following:

Transaction Type
##

E. This display indicates that the bar code reader is ready to use. If this display is not correct, see section 2.2.5 for Loading the C Program into the Bar Code Reader.

2.2.6 Downloading Bar Code Reader Data Files to a PC

This section describes the steps to be performed when downloading data files from the bar code reader to a personal computer. The System Administrator performs these tasks after the bar code reader is returned from the field. These steps must be completed before the data files are deleted from the bar code reader.

2.2.6.1 PDT 3300 Files

A. Ensure the female end of the null modem cable is connected to the COM1 port of the PC.

B. If the bar code reader is off, press the **ON/OFF** key. If the display is Project?, go to C below. If Project? does not appear, turn the bar code reader off. Then press the **Shift** key and letter **L** key simultaneously and turn the bar code reader on. Release the **Shift** and letter **L** keys. The bar code reader should display D:\>. If successful, go to E below. If not, contact programming support.

C. At the Project? prompt, press the **F1** key and the bar code reader will display the following:

Type password
To exit program

D. Type the bar code reader password and press the **Enter** key. If the password is correct, the bar code reader will display D:\>. If the password is incorrect, the bar code reader will return to the Transaction Type prompt.

E. Insert the unattached end of the null modem cable into the communications port of the cradle module.

F. Press the letter **T** key on the bar code reader keypad and press the **Enter** key. "T" is a batch job on the bar code reader to transfer any type of file to a PC.

G. Select the appropriate program according to the sample type:

1. For groundwater, surface water, soil, sediment, or seeps and springs samples collection, use the PC keyboard from the C:\BAR CODE subdirectory to enter:

   getdata filename

   and press the **Enter** key.

2. For water level collections, use the PC keyboard from the C:\BAR CODE subdirectory to enter:

   getwl filename

   and press the **Enter** key.

3. For mercury results, use the PC keyboard from the C:|BAR CODE subdirectory to enter:

   gethg filename

   and press the **Enter** key.

4. For baseflow field measurements, use the PC keyboard from the C:\BAR CODE subdirectory to enter:

   getbf filename

   and press the **Enter** key.

5. If more than one type of transaction has been collected, the getdata, getwl, gethg, and getbf programs may have to be run.

6. Use the following filename format:

Filename	where	represents
wfmmddss.yyp	w	Project ID prefix (first character of sample ID)
	f	File Type (“b” for baseflow, “e” for sediment, “g” for groundwater, “l” for water level, “o” for soil, “p” for seeps and springs, "s" for surface water)
	mm	Numeric month (e.g. 03 for March)
	dd	Numeric day (e.g. 13)
	ss	File sequence number if more than one file was created for a given day
	yy	Year (e.g 94 for 1994)
	p	Purpose of file copy ("a" for archive)

Example: getdata ss050902.94a would be surface water data for WAG 6 from the second bar code reader downloaded on May 9, 1994.

H. Once the data is downloaded, the PC will return to the normal system prompt. On the bar code reader, press **Ctrl - Bksp** to return to the D:\> prompt

I. Unplug the null modem cable from the cradle module.

J. The newly downloaded files will be copied to a Bernoulli disk on the site PC which has been designated as an archive disk and become archive data files. Archive files will be maintained in their original form. No modifications or data alterations will be performed on these files.

K. In the Bar Code File Processing Checklist, record the name for each bar code reader file downloaded. This checklist is kept for tracking purposes only and is not a maintainable record.

PEMS - BAR CODE FILE PROCESSING CHECKLIST								
Bar Code File Name	Copy to Archive Disk	FTP to Work Station	Load Temporary Table	Create Report	Report Reviewed	Edit Transactions	Update Database	Delete Bar Code File

Fig. A-9 Bar Code File Processing Checklist.

2.2.6.2 LDT 3805 Files

A. Ensure the female end of the null modem cable is connected to the COM1 port of the PC.

B. Place the bar code reader into the cradle module. If the bar code reader is off, press the **PWR** key. If the display is Project?, go to C below. If Project? does not appear, turn the bar code reader off. Then press the **4** and **5** keys simultaneously and turn the bar code reader on. Release the **4** and **5** keys. The bar code reader should display D:\>. If successful, go to E below. If not, contact programming support.

C. At the Project? prompt, press the **F1** key and the bar code reader will display the following:

Type password
To exit program

D. Type the bar code reader password and press the **Enter** key. If the password is correct, the bar code reader will display D:\>. If the password is incorrect, the bar code reader will return to the Transaction Type prompt.

E. Insert the unattached end of the null modem cable into the communications port of the cradle module.

F. Press the letter **T** key on the bar code reader keypad and press the **Enter** key. "T" is a batch job on the bar code reader to transfer any type of file to a PC.

G. Select the appropriate program according to the sample type:

1. For groundwater, sediment, surface water, soil, or seeps and springs samples collection, use the PC keyboard from the C:\BAR CODE subdirectory to enter:

getdata filename

and press the **Enter** key.

2. For water level collections, use the PC keyboard from the C:\BAR CODE subdirectory to enter

getwl filename

and press the **Enter** key.

3. For mercury results, use the PC keyboard from the C:|BAR CODE subdirectory to enter:

gethg filename

and press the **Enter** key.

4. For baseflow field measurements, use the PC keyboard from the C:\BAR CODE subdirectory to enter:

   getbf filename

   and press the **Enter** key.

5. If more than one type of transaction has been collected, the getdata, getwl, gethg, and getbf programs may have to be run.

6. Use the following filename format:

Filename	where	represents
wfmmddss.yyp	w	Project ID prefix (first character of sample ID)
	f	File Type (“b” for baseflow, “e” for sediment, “g” for groundwater, “l” for water level, “o” for soil, "p" for seeps and springs, “s” for surface water)
	mm	Numeric month (e.g. 03 for March)
	dd	Numeric day (e.g. 13)
	ss	File sequence number if more than one file was created for a given day
	yy	Year (e.g 94 for 1994)
	p	Purpose of file copy ("a" for archive)

   Example: getdata sl050902.94a would be water level data for WAG 6 from the second bar code reader downloaded on May 9, 1994.

H. Once the data is downloaded, the PC will return to the normal system prompt. On the bar code reader, press **Ctrl - Bksp** to return to the D:\> prompt

I. Unplug the null modem cable from the cradle module.

J. The newly downloaded files will be copied to a Bernoulli disk on the site PC which has been designated as an archive disk and become archive data files. Archive files will be maintained in their original form. No modifications or data alterations will be performed on these files.

K. In the Bar Code File Processing Checklist record the name for each bar code reader file downloaded. This checklist is kept for tracking purposes only and is not a maintainable record.

2.2.7 Transferring Data Files to the Workstation

This section describes the steps to be performed when transferring downloaded files from the PC to the Workstation. The downloaded files will be transferred to the PEMS workstation using the File Transfer Protocol (FTP) program which is part of the PCTCP software package on the site PC. This process will be accomplished as follows:

A. Change to the PC directory that contains the files to be uploaded, e.g., cd Bar code.

B. Type *ftp PEMS* and press **Enter**.

C. Type your username at the name prompt and press **Enter**.

D. Type your password at the password prompt and press **Enter**.

E. Next, type *put <filename>* (where <filename> represents the name of the file to be uploaded) and press **Enter**.

F. On the workstation, type *cp <filename> /data/input* and press **Enter** to copy the file to the /data/input directory.

G. Repeat steps E and F above for the next file to be loaded.

H. Close the FTP session by typing *bye* or *quit* and pressing **Enter**.

I. The data/input directory is automatically checked every 10 minutes by the system to determine if the directory contains files which should be loaded to the ORACLE database and archived in the /data/archive/bcde directory.

2.3 PROGRAMMER

This section outlines the steps in writing and maintaining C programs, preparing transaction flow chart and menu sheets. These steps are performed by the Programmer.

2.3.1 Bar Code Program Writing and Maintenance

Program development guidelines include:

- Programs for the bar code reader will be written in the C language using references B, G, H, I, and L.
- Programs will be written on a personal computer.
- Testing and validation will be performed after downloading the executable file to the bar code reader.

All requests for program changes will be in accordance with PEMS Configuration Control Plan.

2.3.2 Flow Chart Preparation

A transaction flow chart will be prepared for each transaction. It will include a process or decision box for each prompt and will contain the word "SCAN" in addition to the prompt. Flow lines and arrows will depict the transaction flow. A legend at the bottom will list any special function keys available to the transaction.

2.3.3 Menu Sheet Preparation

Menu sheets will be prepared for each transaction. The menu sheets will contain bar code labels and their interpretations for items normally hand written into the logbooks. These bar code labels may be scanned during the data collection activity. The most accurate way of data entry into

the bar code reader is scanning, not keying. Therefore, it is highly desirable to have every response in a transaction available as a bar code label. These menu sheets may require frequent updates.

2.4 FIELD USER

Field Users must be familiar with using and handling of bar code equipment, as well as, charging and replacing batteries.

2.4.1 Bar Code Reader Use and Handling

The PDT 3300 and LDT 3805 bar code readers and wand are dust-proof, water resistant, and sealed against most environmental contaminants. They can withstand multiple 4-ft drops onto a concrete surface covered by one-eighth inch asphalt floor tile and continue operating without malfunction or loss of data.

The PDT 3300 and LDT 3805 bar code readers will be maintained according to the manufacturer recommendations (See Section 2.2.3).

2.4.1.1 User Equipment Configuration

This section specifies the components for each bar code equipment configuration utilized by the user.

PDT 3300. The following items are required by bar code user:

- PDT 3300 Portable Data Terminal
- Wand
- NiCad battery pack
- Two button cell lithium batteries
- Two 9-volt alkaline batteries
- Bar Code labels (Code 39)
- Menu sheets
- Transaction flow chart

LDT 3805. The following items are required by bar code user:

.

- LDT 3805 Portable Data Terminal
- NiCad battery pack
- One 9-volt alkaline battery
- Bar Code labels (Code 39)

- Menu sheets
- Transaction flow chart

2.4.2 Data Scanning

Scanning is the preferable way to input data and reduce errors.

2.4.2.1 Wand Use

The following steps describe the proper method for data scanning using a wand:

A. Hold the digital wand (attached to the bar code reader) with the tip lightly touching the bar code label. The digital wand should be tilted slightly, as you would a pencil.

B. Place the tip of the digital wand in the white area at the beginning or the end of the bar code label. Scanning can be done from left to right or right to left.

C. Using very light pressure, move the wand through the entire bar code. The wand will read the label.

D. If the bar code label was read correctly, corresponding characters will appear on the bar code reader display screen, and a single tone will sound to indicate a correct scan.

E. If the scan was unsuccessful, repeat steps A through D above or key in the data.

2.4.2.2 Laser Scanner Use

The following steps describe the proper method for data scanning using a laser:

A. Pull the trigger of the bar terminal handle to power on the bar code reader.

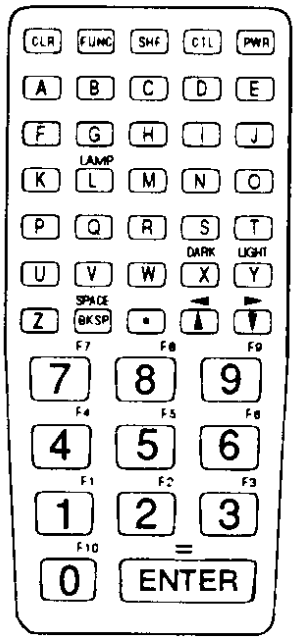
B. Hold the bar code reader within range and at a slight angle to the bar code label you wish to scan and pull the trigger. A thin red beam appears over and must cover the entire length of the bar code. Do not hold the scanner directly over the bar code. The larger the bar code, the farther away you should hold the scanner.

CAUTION: DO NOT LOOK INTO THE LASER BEAM OR POINT IT AT ANOTHER PERSON. LASERS CAN CAUSE EYE DAMAGE.

C. If the red line does not touch the bar code, re-aim the scanner and repeat step B. If the scanner still does not operate, see your programming support for help.

2.4.2.3 Keying Data

In addition to scanning data, the key pad can be used to input data into the bar code reader. To use this method of data input, type the data value in with the key pad. If all character slots are filled, it is not necessary to press the **Enter** key, the bar code reader will automatically go to the next display. If all character slots are not filled, press the **Enter** key.



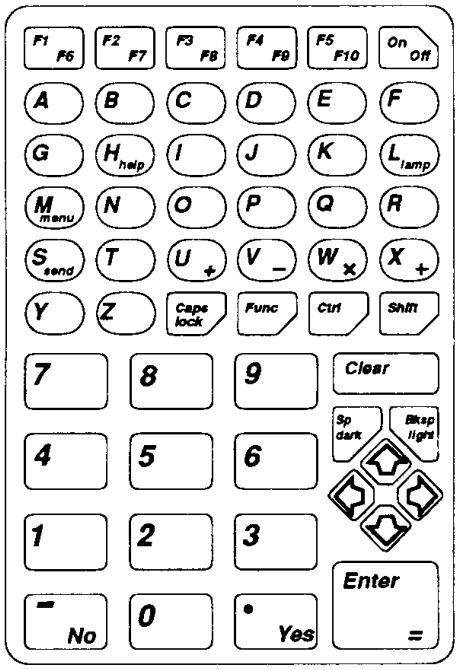


Fig. A-10 PDT 3300 Keypad.

Fig. A-11 LDT 3805 Keypad.

2.4.2.4 Display

The LCD display consists of eight lines of 20 characters, all of which can be displayed at one time. The cursor will be the left-most position. The display may show information needed, for example, LMES BADGE on one line and on the next line, the display will show ######## indicating the input field size. The series of pound symbols (#) indicate the maximum number of characters that can be scanned or keyed.

When new lines are displayed, the previous lines are scrolled up. A maximum of eight lines is displayed.

If the display is not used over a period of time, it will shut down. This automatic shutoff helps reduce battery discharge. To turn on the display and continue the transaction, press the **ON/OFF** key on the PDT 3300 keypad or the **PWR** key on the LDT 3805 key pad. The program resumes where the display went off.

2.4.2.5 Low Battery Indicator

A fat blinking cursor on the display indicates a low battery. When this happens, transport the reader to the System Administrator as soon as practical or if using the PDT 3300 bar code reader, recharge the NiCad battery using the steps outline in section 2.4.3 below or if using either the PDT 3300 or LDT 3805 replace the primary battery using the appropriate steps outlined in section 2.4.4 below.

2.4.3 Using 110-volt Recharger Cable

To recharge the NiCad battery pack in the PDT 3300, perform the following steps:

A. Make sure the PDT 3300 bar code reader is off.

B. Place the bar code reader face up and turn the latch located on the bottom end cap counterclockwise to the open position.

C. Pull the end cap down and open.

D. Locate the bar code reader's battery charger port (12-volt adapter jack). This port is located on the right side and is labeled 12 VDC.

E. Using the recharger cable, plug the 110-volt plug end of the battery charger into a 110-volt wall outlet and the 12-volt plug end into the bar code reader's battery charger port.

F. After 12 - 16 hours, disconnect the charger cable from the bar code reader.

G. Replace the bottom end cap by pulling it down and placing it on the end of the bar code reader.

H. Turn the latch clockwise to the locked position.

I. Turn the bar code reader on and ensure that the cursor has returned to normal size. If recharging has been unsuccessful, replace the battery as described in 5 below.

2.4.4 Field Replacement of Nicad Battery

2.4.4.1 PDT 3300

An alkaline battery carrier tray and two 9-volt batteries will be sent out with each PDT 3300 bar code reader.

A. Follow steps A through C in section 2.4.3 above.

B. Turn the bar code reader over, display face down.

C. Turn the knob located on the back cover counterclockwise and remove the cover.

D. Remove the NiCad battery pack.

E. Place the alkaline battery carrier tray in the bar code reader with prongs down. Press down on the carrier tray (it will snap into place).

F. Install new batteries. Batteries should be installed with the positive (+) and negative (-) signs in the correct direction. See inside the alkaline carrier tray on the bar code reader for directions. See section 2.2.4.2.

G. Replace the battery pack cover. Put the top in first and press down at the bottom. Then turn the latch clockwise to the locked position.

H. Replace the bottom end cap by pulling it down and placing it on the end of the bar code reader.

I. Turn the latch clockwise to the locked position.

J. Turn the bar code reader on and ensure that the cursor has returned to normal size. If replacing the batteries has been unsuccessful, return the bar code reader to the System Administrator.

2.4.4.2 PDT 3805

An alkaline battery carrier tray and one 9-volt battery will be sent out with each LDT 3805 bar code reader.

A. Twist the D ring on the bottom of the handle 90 degrees counter-clockwise and remove the end cap.

B. Remove the NiCad battery pack.

C. Insert the alkaline battery into the alkaline battery adapter. Make sure the positive (+) and negative (-) signs on the battery are on the same side as the positive and negative signs on the picture of the battery inside the adapter.

D. Hold the adapter so the solid plastic side is down and the battery is visible on the top. Slide the adapter into the battery compartment with the rounded (large) size toward the back of the bar code reader.

E. Push firmly on the side of the battery nearest the back of the bar code reader until the battery snaps into the contacts.

F. Put the end cap on and twist the D-ring halfway clockwise to lock it.

G. Press the D ring flat to secure it.

2.4.5 Battery Charging

Recharging the NiCad batteries using the 110-volt to 12-volt recharger cable (see section 2.2.4.1).

2.4.6 Battery Replacement

Replacing the NiCad battery pack as needed during field operation (see section 2.2.4.2).

2.5 TRANSACTIONS

Transactions, activities which involve user prompting by the bar code equipment, are described in the following sections:

- Date Test
- Groundwater
- Groundwater Level
- Mercury Results
- Sediment
- Soil
- Surface Water/BaseFlow

2.5.1 Date Test (DT)

The Date Test (DT) transaction is used to ensure that the system date and time are set in the bar code reader correctly. This transaction must be run prior to data collection activities.

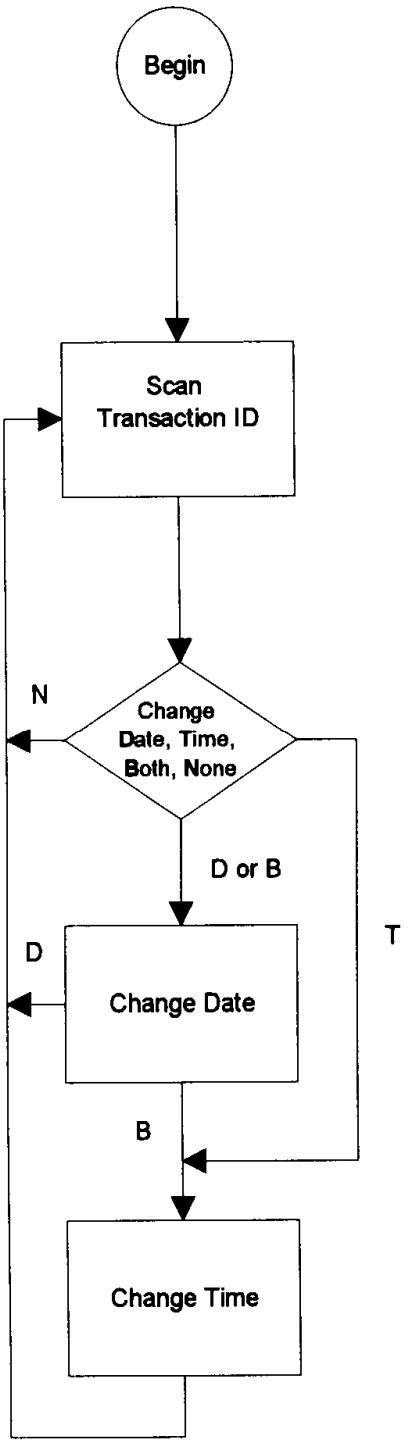


Fig. A-12 Date Test (DT) Flow Chart.

2.5.1.1 Purpose/Scope

The Date Test (DT) transaction is used to verify the current date and time when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. This transaction must be done first, before any data is scanned or keyed into the reader.

2.5.1.2 Actions Steps

A. Turn the bar code reader on. The following prompt will appear on the screen:

Prompt: Transaction Type
##
Response: Scan DT on the Date Test Transaction Flowchart or key in DT and press the **Enter** key.

B. The following prompt appears on the screen:

Prompt: Date is (current system date in DDMMMYYYY format)
Time is (current system time in HHMM format)
Change (D)ate (T)ime
(B)oth or (N)one
Response:
1. If the date and time appear correctly, press N for none. The program returns to the transaction type prompt and is ready for the next transaction.

2. If the date is incorrect, press D. The following prompts will appear:

Prompt: Date Set
Month
##
Response: Enter the current month (01 for January through 12 for December).

Prompt: Day
##
Response: Enter current day of month (01 through 31).

Prompt: Year
####
Response: Enter current year (1993 through 2030).

3. If the time is incorrect, press T. The following prompts will appear:

Prompt: Hour
##
Response: Enter the current hour (00 - 23).

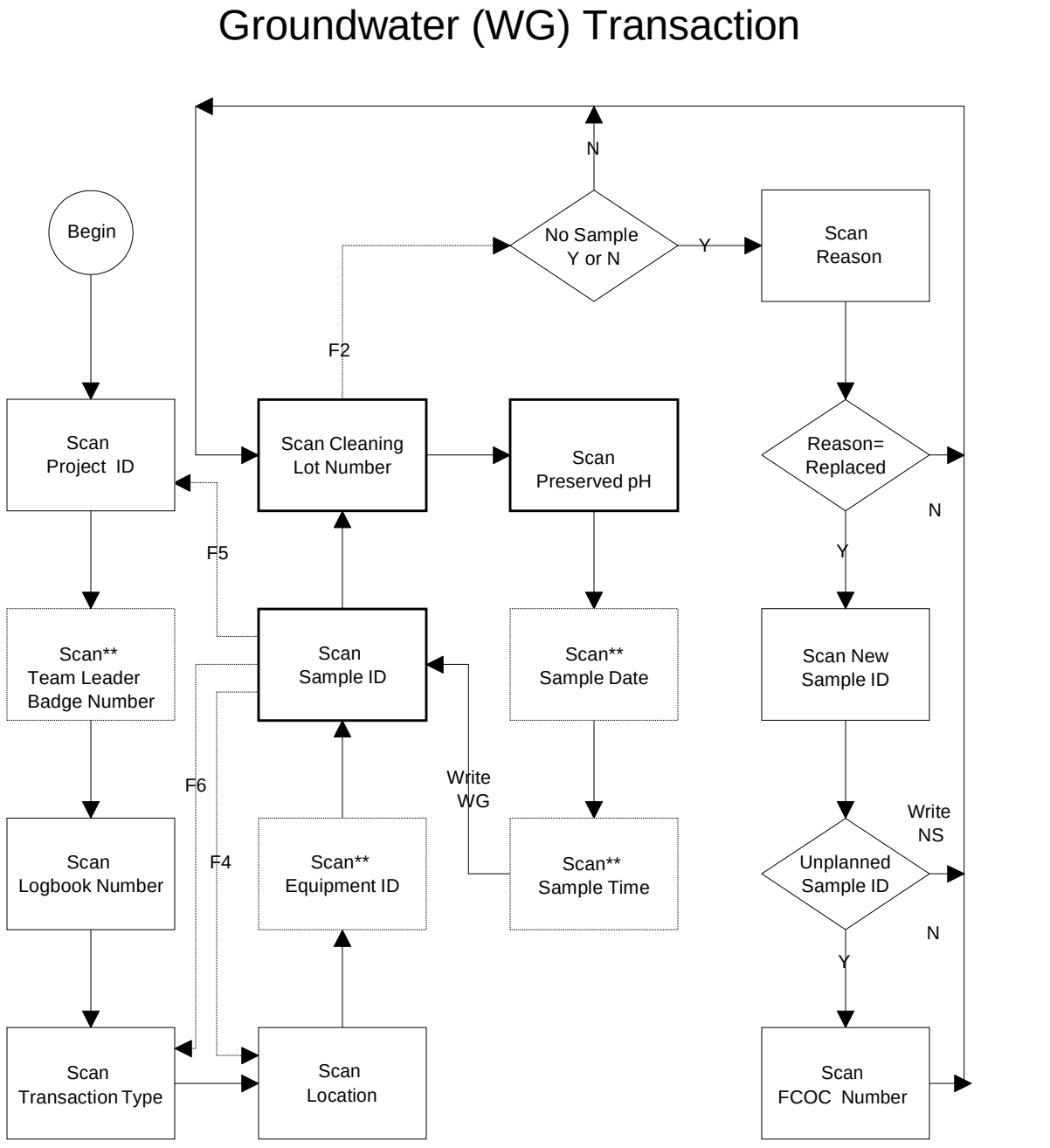
Prompt: Minute
##
Response: Enter the current minute (00 - 59).

4. If both date and time are incorrect, press B. Prompts of both 2 and 3 above will be displayed.

5. Once the information is entered, this transaction is complete. The bar code reader is ready for the next transaction and the program returns to A above.

Prompt:	Transaction ##
Response:	Enter the next transaction code.

2.5.2 Groundwater (WG) Transaction



- - - Function Keys.
F1 previous field.
F2 sample not taken from Scan Cleaning Lot Number.
F4 returns to Scan Location from Scan Sample ID.
F5 returns to Scan Project from Scan Sample ID.
F6 returns to Scan Transaction Type from Scan Sample ID.

NS No Sample Taken transaction.
WG Groundwater transaction.
** Team Leader Badge Number, Equipment, Sample Date and Sample Time may be defaulted and prompts will not appear.

Fig. A-13 Groundwater (WG) Transaction.

2.5.2.1 Purpose/Scope

The Groundwater (WG) Transaction is used for data collection for groundwater collection activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.2.2 Actions Steps.

Turn the bar code reader on and the following prompts appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader Badge #?
######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Logbook #?
###############
Response: Scan logbook number.

D. Prompt: Transaction Type?
##
Response: Scan transaction type.

E. Prompt: Location?
##########
Response: Scan monitoring location.

F. Prompt: Equipment ID?
##########
Response: This field may be defaulted. If not, scan equipment id.

G. Prompt: Sample ID?
###############
Response: This is a pivotal prompt in the transaction.

1. Press F4 to return to Scan Location prompt.
2. Press F5 to return to the Scan Project ID prompt.
3. Press F6 to return to Scan Transaction Type prompt.
4. Scan sample id.

H. Prompt: Cleaning Lot Number?
###############
Response: This is a pivotal prompt for the transaction.

1. If sample taken, scan cleaning lot number.

2. If sample not taken, press F2.

(a). Prompt: No sample collected
Press Y if OK
#
Response: Press “Y” if no sample taken. Pressing any other key will return to Scan Cleaning Lot Number prompt.

(b). Prompt: Reason?
##########
Response: This is a pivotal prompt for the transaction.

(1). If reason was other than ”REPLACED”, the program returns to Scan Sample ID prompt.

(2). If reason was “REPLACED”:

Prompt: New Sample ID?
#############
Response: Scan new sample id. If sample id does not begin with “UNPLANNED”, the program writes a NS transaction and returns to Scan Cleaning Lot Number prompt.

(3). If sample id begins with “UNPLANNED”:

Prompt: FCOC Number?
###############
Response: Scan FCOC Number. The program returns to the Scan Cleaning Lot Number prompt.

I. Prompt: Preserved pH?
##
Response: Scan preserved pH. Must be blank or 1-14.

J. Prompt: Sample date is ddmmmyyyy
Change Sample Date
(Y) or (N) ?
#
Response: This is a pivotal field for the transaction.

1. If “N” is entered, the sample date is accepted as displayed.

2. If “Y” is entered, then

Prompt: Sample/Analysis Date
Month?
##
Response: Enter two-character numeric month.

Prompt: Day?
##
Response: Enter two-character numeric day.

Prompt: Year?
####
Response: Enter four-character numeric year.

K. Prompt: Sample/Analysis Time
Hour?
##
Response: Enter military hour (0 - 23).

Prompt: Minute?
##
Response: Enter minutes (00 - 59). A WG transaction record is written at this time and the program returns to Scan Sample ID prompt.

2.5.3 Groundwater Level (WL) Transaction

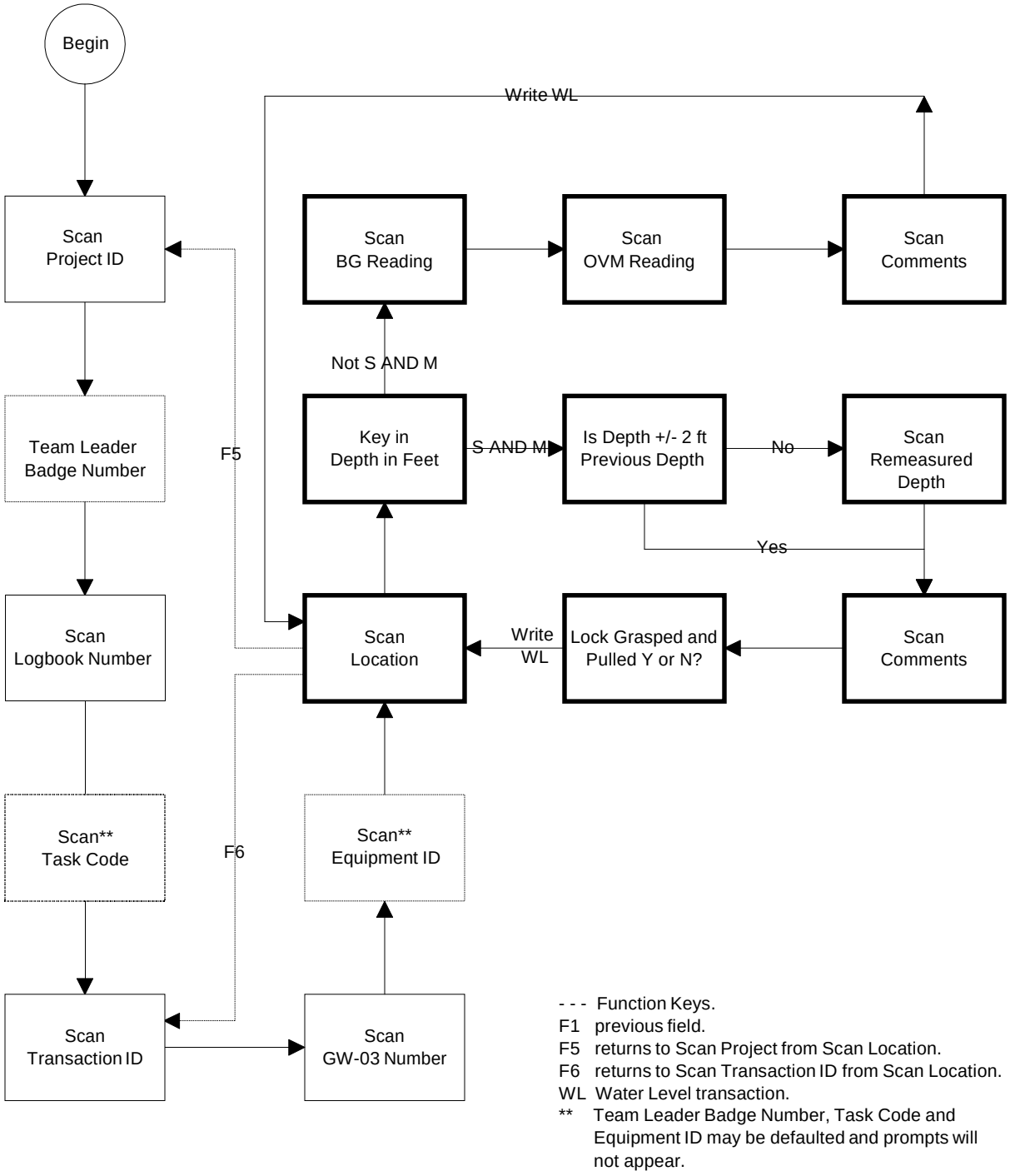


Fig. A-14 Groundwater Level (WL) Transaction.

2.5.3.1 Purpose/Scope

The Groundwater Level (WL) Transaction is used for data collection of depth to water activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.3.2 Actions Steps.

Turn the bar code reader on. The following prompts will appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader
LMES Badge #?
#######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Logbook #?
##########
Response: This field may be defaulted. If not, scan logbook number.

D. Prompt: Transaction Type?
##
Response: Scan transaction type.

E. Prompt: Task Code?
#####
Response: This field may be defaulted. If not, scan the task code.

F. Prompt: GW-03 Number?
###############
Response: Scan GW-03 number.

G. Prompt: Equipment ID?
#########
Response: This field may be defaulted. If not, scan equipment id.

H. Prompt: Location?
##########
Response: This is a pivotal prompt for the WL transaction.

1. Press F5 to return to Scan Project ID prompt.

2. Press F6 to return to Scan Transaction Type prompt.

3. Scan monitoring location.

I. Prompt: Depth to water in ft?
#######
Response: This is a pivotal prompt for the WL transaction.

1. Key in depth to water in feet.

2. If environmental project is IWQP-ORNL, go to Scan Is depth +- 2 ft prompt.

J. Prompt: BG reading in cpm?
########
Response: Key in bg reading in counts per minute.

K. Prompt: OVM reading in ppm?
########
Response: Key in ovm in parts per million.

L. Prompt: Comments?
####################
Response: Scan comments. Press ENTER if no comments. A WL transaction is written at this time and the program returns to Scan Location prompt.

M. Prompt: Is depth +- 2 ft
Previous depth
Y or N?
#
Response: This is a pivotal response in the WL transaction.

1. Scan “Y” or “N”.

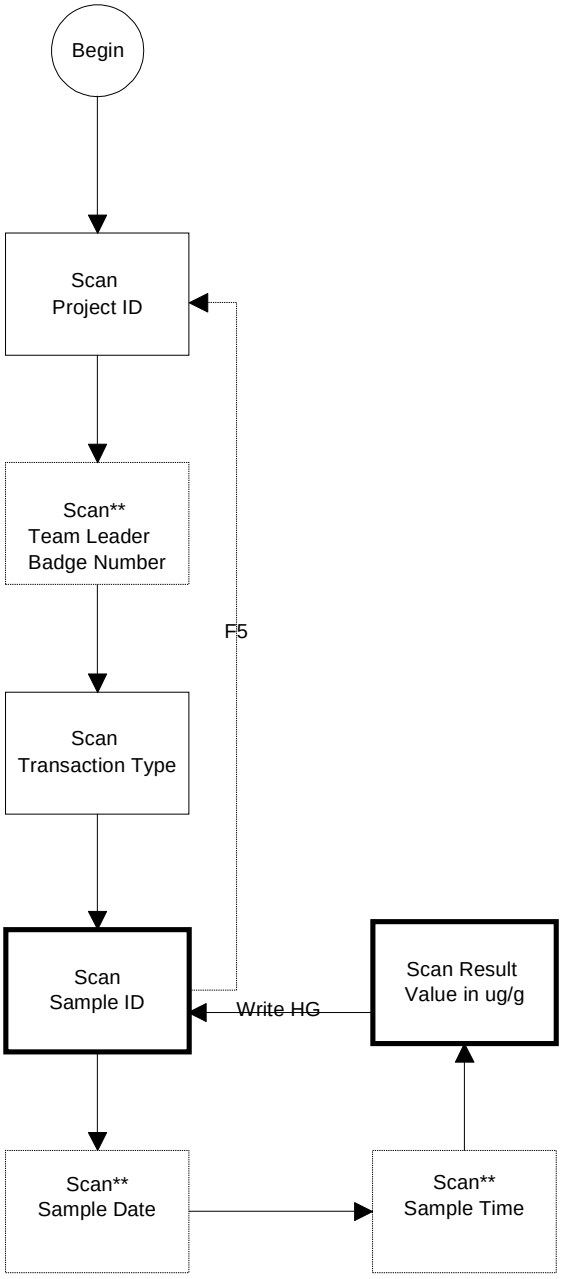
2. If response is “Y”, go to Scan Comments prompt.

N. Prompt: Remeasured depth in ft?
#######
Response: Key in remeasured depth in feet.

O. Comments: Comments?
####################

P. Prompt: Lock grasped and pulled
Y or N?
#
Response: Scan “Y” or “N”. A WL transaction is written at this time. The program returns to Scan Location prompt.

2.5.4 Mercury Results (HG) Transaction



- - - Function Keys.
F1 previous field.
F5 returns to Scan Project from Scan Sample ID.
HG Mercury results transaction.
** Team Leader Badge Number, Sample Date, and Sample Time may be defaulted and prompts will not appear.

Fig. A-15 Mercury Results (HG) Transaction.

2.5.4.1 Purpose/Scope

The Mercury Results Transaction is used for data collection for mercury results collection activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.4.2 Actions Steps.

Turn the bar code reader on. The following prompts will appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader
LMES Badge #?
#######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Transaction Type?
##
Response: Scan transaction type.

D. Prompt: Sample ID?
###############
Response: This is a pivotal prompt in the transaction.

1. Press F5 to return to the Scan Project ID prompt.

2. Scan sample id.

E. Prompt: Date is ddmmmyyyy
Change Analysis Date
(Y) or (N) ?
#
Response: This is a pivotal field for the transaction.

1. If “N” is entered, the program uses the system date and proceeds to Scan Sample/Analysis Time prompt.

2. If "Y" is entered:

Prompt: Month?
##
Response: Enter two character numeric month.

Prompt: Day?
##
Response: Enter two character numeric day.

Prompt: Year?
####
Response: Enter four character numeric year.

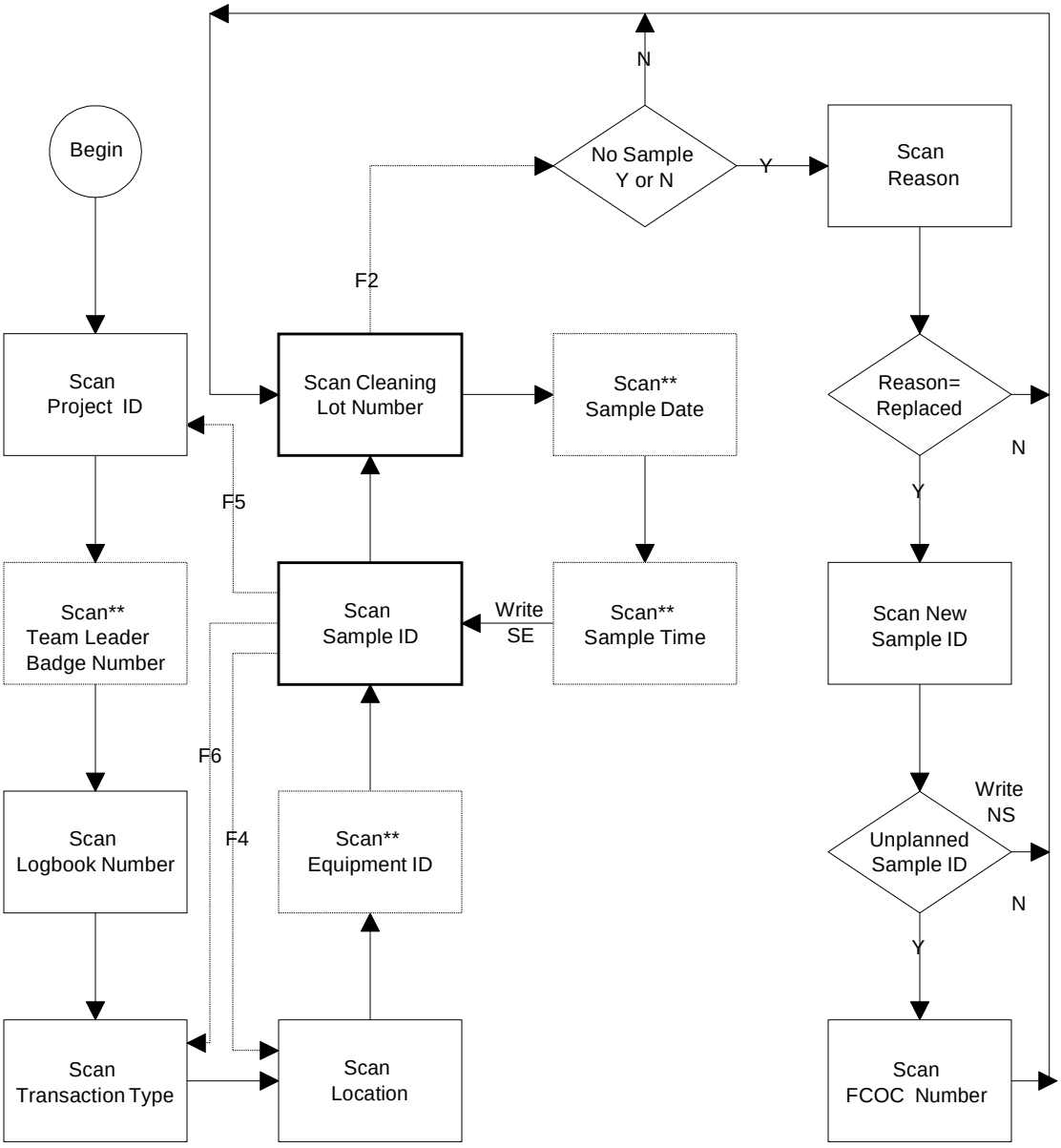
F. Prompt: Sample/Analysis Time
Hour?
##
Response: Enter military hour (0 - 23).

Prompt: Minute?
##
Response: Enter minute (00 - 59).

G. Prompt: Result Value in ug/g?
###########
Response: Enter result value in ug/g. Result value must be < 1000. A HG Transaction is written at this time. The program returns to Scan Sample ID prompt.

2.5.5 Sediment (SE) Transaction

Sediment (SE) Transaction



- - - Function Keys.
F1 previous field.
F2 sample not taken from Scan Cleaning Lot Number.
F4 returns to Scan Location from Scan Sample ID.
F5 returns to Scan Project from Scan Sample ID.
F6 returns to Scan Transaction Type from Scan Sample ID.

NS No Sample Taken transaction.
SE Sediment transaction.
** Team Leader Badge Number, Equipment, Sample Date and Sample Time may be defaulted and prompts will not appear.

Fig. A-16 Sediment (SE) Transaction Flow Chart.

2.5.5.1 Purpose/Scope

The sediment transaction is used for data collection for sediment collection activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.5.2 Actions Steps

Turn the bar code reader on. The following prompts will appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader
LMES badge #?
#######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Logbook #?
###############
Response: Scan logbook number.

D. Prompt: Transaction Type?
##
Response: Scan transaction type.

E. Prompt: Location?
##########
Response: Scan monitoring location.

F. Prompt: Equipment ID?
#########
Response: This field may be defaulted. If not, scan equipment id.

G. Prompt: Sample ID?
###############
Response: This is a pivotal prompt for the transaction.

1. Press F3 to display the sample time of last record written and return to Scan Sample ID prompt.

2. Press F4 to return to Scan Location prompt.

3. Press F5 to return to Scan Project ID prompt.

4. Press F6 to return to Scan Transaction Type prompt.

5. Scan sample id.

H. Prompt: Cleaning Lot Number?
###############
Response: This is a pivotal prompt for the transaction.

1. If sample taken, scan cleaning lot number.

2. Press F2 for no sample taken.

(a). Prompt: No sample collected
Press Y if OK
#
Response: Press “Y” if no sample taken. Pressing any other key will return to Scan Cleaning Lot Number prompt.

(b). Prompt: Reason?
##########
Response: This is a pivotal prompt for the transaction.

(1). If reason was other than “REPLACED”, the program returns to Scan Sample ID prompt.

(2). If reason was “REPLACED”:

Prompt: New Sample ID?
###############
Response: Scan new sample id. If the sample id does not begin with “UNPLANNED”, the program writes a NS transaction and returns to Scan Cleaning Lot Number prompt.

(3). If sample id begins with “UNPLANNED”:

Prompt: FCOC Number?
###############
Response: Scan FCOC Number. The program returns to Scan Cleaning Lot Number prompt.

I. Prompt: Date is ddmmmyyyy
Change Sample Date
(Y) or (N) ?
#
Response: This is a pivotal field for the transaction.

1. If “N” is entered, the sample date is accepted as displayed.

2. If “Y” is entered, then

   Prompt: Sample/Analysis Date
   Month?
   ##
   Response: Enter two-character numeric month.

   Prompt: Day?
   ##
   Response: Enter two-character numeric day.

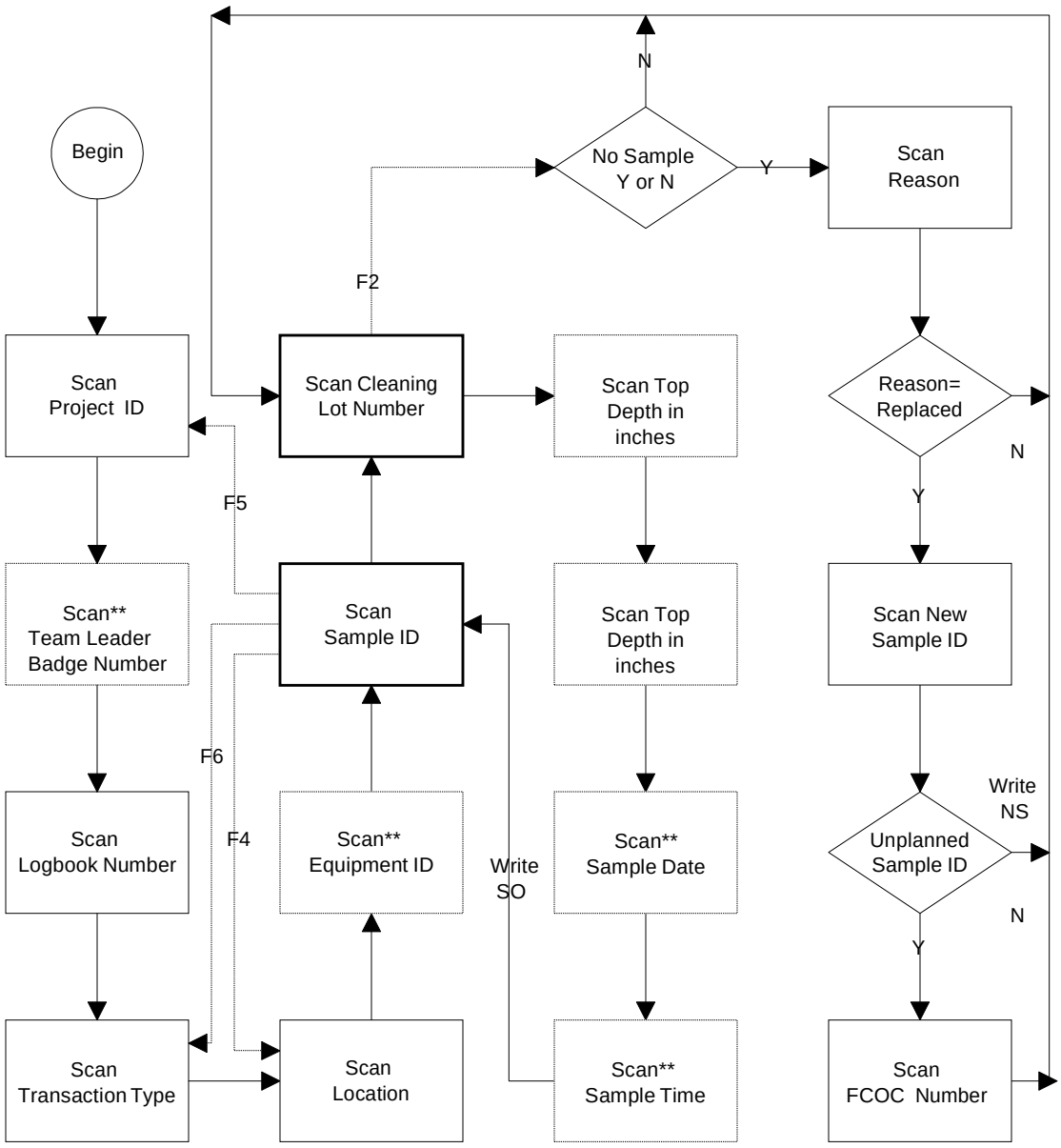
   Prompt: Year?
   ####
   Response: Enter four character numeric year.

J. Prompt: Sample/Analysis Time
   Hour?
   ##
   Response: Enter military hour (0 - 23).

   Prompt: Minute?
   ##
   Response: Enter minute (00 - 59). A SE transaction is written at this time. The program returns to Scan Sample ID prompt.

2.5.6 Soil (SO) Transaction

Soil (SO) Transaction



- - - Function Keys.
F1 previous field.
F2 sample not taken from Scan Cleaning Lot Number.
F4 returns to Scan Location from Scan Sample ID.
F5 returns to Scan Project from Scan Sample ID.
F6 returns to Scan Transaction Type from Scan Sample ID.

NS No Sample Taken transaction.
SO Soil transaction.
** Team Leader Badge Number, Equipment ID, Top Depth, Bottom Depth, Sample Date and Sample Time may be defaulted and prompts will not appear.

Fig. A-17 Soil (SO) Transaction Flow Chart.

2.5.6.1 Purpose/Scope

The soil transaction is used for data collection for soil collection activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.6.2 Actions Steps

Turn the bar code reader on and the following prompts appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader Badge #?
######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Logbook #?
###############
Response: Scan logbook number.

D. Prompt: Transaction Type?
##
Response: Scan transaction type.

E. Prompt: Location?
##########
Response: Scan monitoring location.

F. Prompt: Equipment ID?
##########
Response: This field may be defaulted. If not, scan equipment id.

G. Prompt: Sample ID?
###############
Response: This is a pivotal prompt in the transaction.

1. Press F4 to return to Scan Location prompt.
2. Press F5 to return to Scan Project ID prompt.
3. Press F6 to return to Scan Transaction Type prompt.
4. Scan sample id.

H. Prompt: Cleaning Lot Number?
###############
Response: This is a pivotal prompt for the transaction.

1. If sample taken, scan cleaning lot number.

2. If sample not taken, press F2.

(a). Prompt: No sample collected
Press Y if OK
#
Response: Press “Y” if no sample taken. Pressing any other key will return to Scan Cleaning Lot Number prompt.

(b). Prompt: Reason?
##########
Response: This is a pivotal prompt for the transaction.

(1). If reason was other than “REPLACED”, the program returns to Scan Sample ID prompt.

(2). If reason was “REPLACED”:

Prompt: New Sample ID?
############
Response: Scan new sample id. If sample id does not begin with “UNPLANNED”, the program writes a NS transaction and returns to Scan Cleaning Lot Number prompt.

(3). If sample id begins with “UNPLANNED”:

Prompt: FCOC Number?
############
Response: Scan FCOC Number. The program returns to the Scan Cleaning Lot Number prompt.

I. Prompt: Top Depth in inches?
#######
Response: This field may be defaulted. If not, enter top depth in inches.

J. Prompt: Bottom Depth in inches?
#######
Response: This field may be defaulted. If not, enter bottom depth in inches.

K. Prompt: Date is ddmmmyyyy
Change Sample Date
(Y) or (N) ?
#
Response: This is a pivotal field for the transaction.

1. If “N” is entered, sample date is accepted as displayed.

2. If “Y” is entered, then

Prompt: Sample/Analysis Date
Month?
##
Response: Enter two-character numeric month.

Prompt: Day?
##
Response: Enter two-character numeric day.

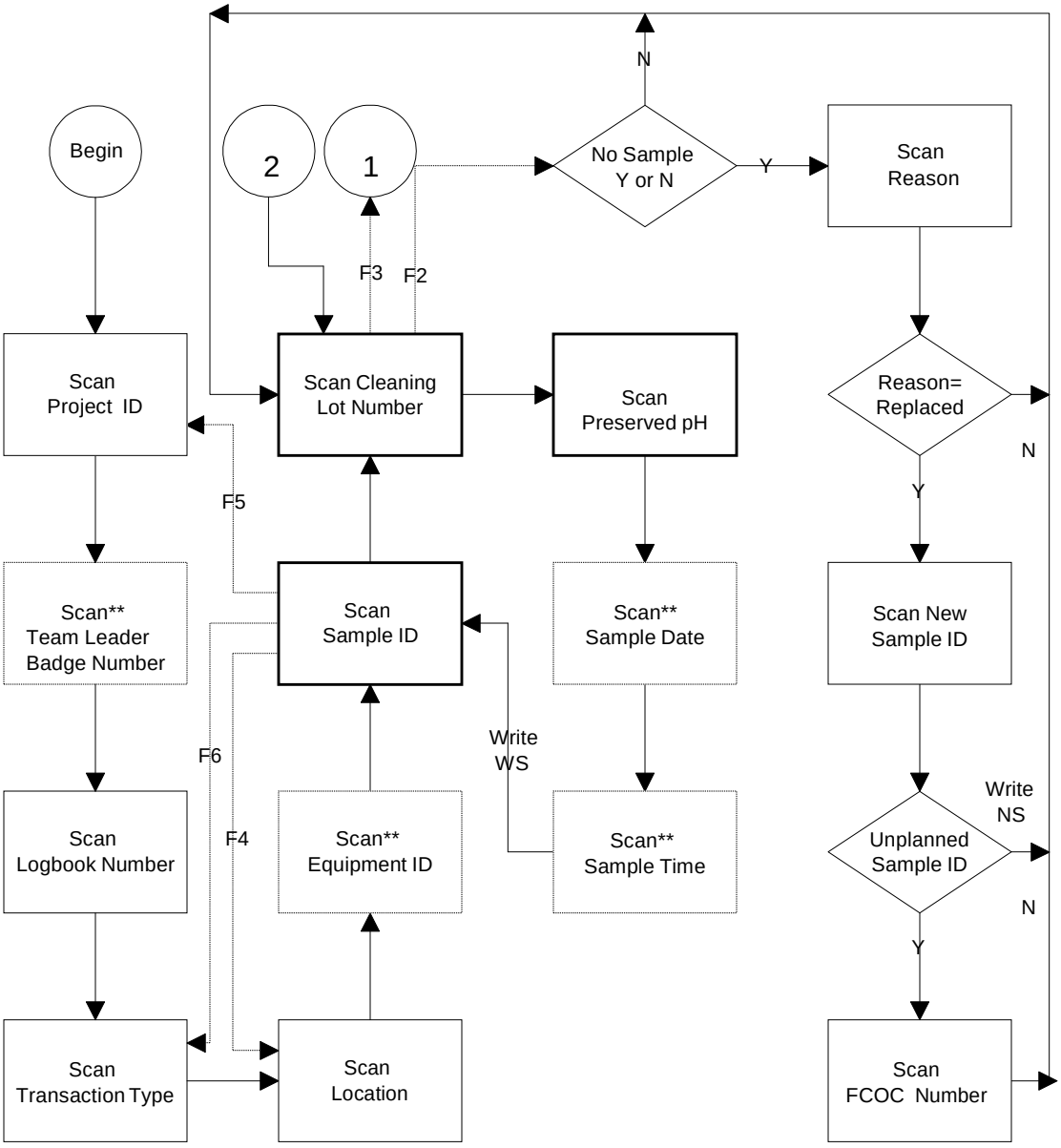
Prompt: Year?
####
Response: Enter four-character numeric year.

L. Prompt: Sample/Analysis Time
Hour?
##
Response: Enter military hour (0 - 23).

Prompt: Minute?
##
Response: Enter minutes (00 - 59). A SO transaction record is written at this time and the program returns to Scan Sample ID prompt.

2.5.7 Surface Water/BaseFlow (WS) Transaction

Surface Water / Baseflow (WS) Transaction



- - - Function Keys.
F1 previous field.
F2 sample not taken from Scan Cleaning Lot Number.
F3 allows collection of Baseflow Field Measurements.
F4 returns to Scan Location from Scan Sample ID.
F5 returns to Scan Project from Scan Sample ID.
F6 returns to Scan Transaction Type from Scan Sample ID.

NS No Sample Taken transaction.
WS Surface Water transaction.
** Team Leader Badge Number, Equipment, Sample Date and Sample Time may be defaulted and prompts will not appear.

Fig. A-18 Surface Water/Baseflow (WS) Transaction (Part 1).

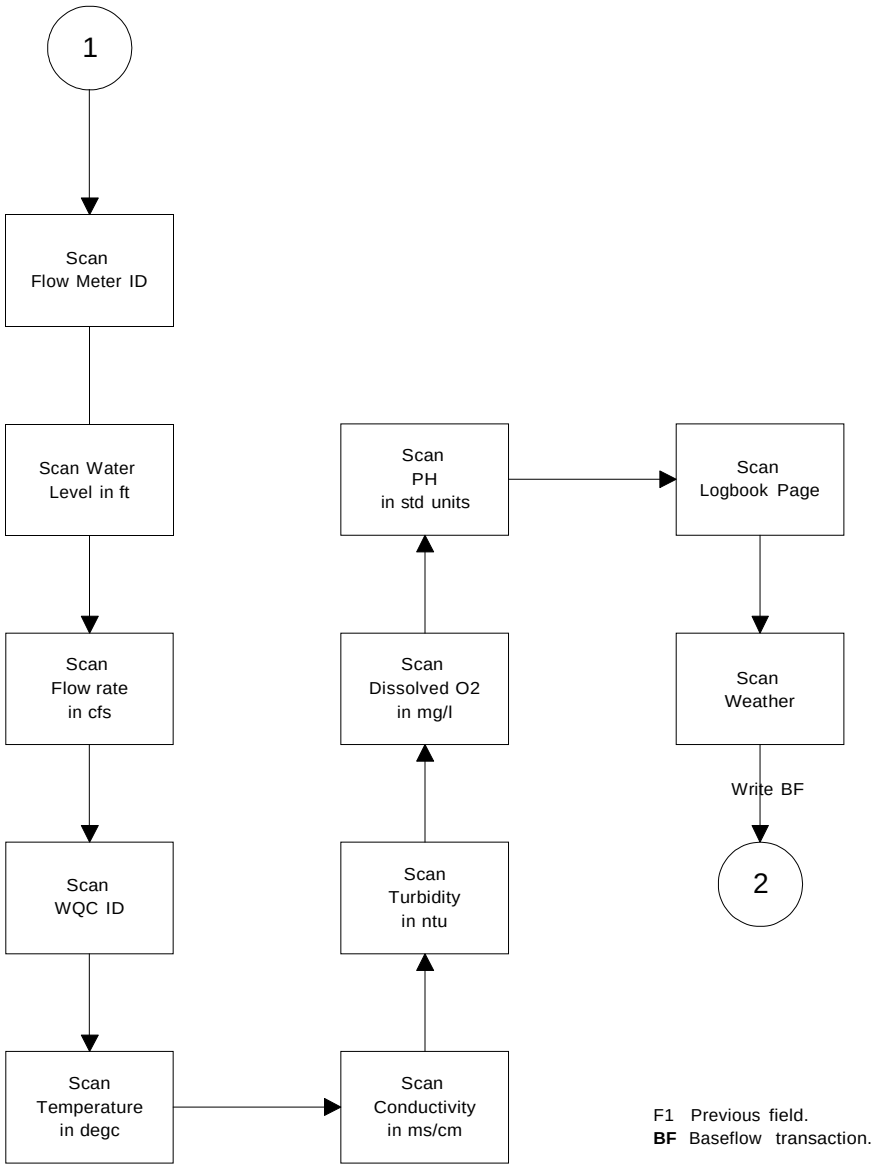


Fig. A-19 Surface Water/Baseflow (WS) Transaction (Part 2).

2.5.7.1 Purpose/Scope

The Surface Water transaction is used for data collection for surface water collection activities when using the PDT 3300 Portable Data Terminal or LDT 3805 Laser Data Terminal (bar code readers) by Symbol Technologies, Incorporated. The Date Test (DT) transaction must have been completed prior to this transaction.

2.5.7.2 Actions Steps.

Turn the bar code reader on. The following prompts will appear on the screen:

A. Prompt: Project ID?
##########
Response: Scan project id.

B. Prompt: Team Leader
LMES badge #?
#######
Response: This field may be defaulted. If not, scan team leader badge number.

C. Prompt: Logbook #?
###############
Response: Scan logbook number.

D. Prompt: Transaction Type?
##
Response: Scan transaction type.

E. Prompt: Location?
##########
Response: Scan monitoring location.

F. Prompt: Equipment ID?
#########
Response: This field may be defaulted. If not, scan equipment id.

G. Prompt: Sample ID?
###############
Response: This is a pivotal prompt for the transaction.

1. Press F3 to display the sample time of last record written and return to Scan Sample ID prompt.

2. Press F4 to return to Scan Location prompt.

3. Press F5 to return to Scan Project ID prompt.

4. Press F6 to return to Scan Transaction Type prompt.

5. Scan sample id.

H. Prompt: Cleaning Lot Number?
###############
Response: This is a pivotal prompt for the transaction.

1. If sample taken, scan cleaning lot number.

2. Press F2 for no sample taken.

(a). Prompt: No sample collected
Press Y if OK
#
Response: Press “Y” if no sample taken. Pressing any other key will return to Scan Cleaning Lot Number prompt.

(b). Prompt: Reason?
##########
Response: This is a pivotal prompt for the transaction.

(1). If reason was other than “REPLACED”, the program returns to Scan Sample ID prompt.

(2). If reason was “REPLACED”:

Prompt: New Sample ID?
###############
Response: Scan new sample id. If sample id begins with “UNPLANNED”, the program writes a NS transaction and returns to Scan Cleaning Lot Number prompt.

(3). If sample id begins with “UNPLANNED”:

Prompt: FCOC Number?
###############
Response: Scan FCOC Number. The program returns to the Scan Cleaning Lot Number prompt.

3. Press F3 to collect baseflow field measurements.

(a). Prompt: Flow Meter ID?
#########
Response: This field may be defaulted. If not, scan flow meter id.

(b). Prompt: Water Level in ft?
#######
Response: This is an optional field. If taken, enter water level in feet.

(c). Prompt: Flow Rate in cfs?
#######
Response: This is an optional field. If taken, enter flow rate in cubic feet per second.

(d). Prompt: Water Quality Checker ID?
#########
Response: Scan water quality checker id.

(e). Prompt: Temperature in degc?
#######
Response: Enter temperature in degree centigrade.

(f). Prompt: Conductivity in ms/cm?
#######
Response: Enter conductivity in millisiemens per centimeter.

(g). Prompt: Turbidity in ntu?
#######
Response: Enter turbidity in nephelometric turbidity units.

(h). Prompt: Dissolved O_2 in mg/l?
#######
Response: Enter dissolved oxygen in milligrams per liter.

(I). Prompt: pH in std units?
#######
Response: Enter ph in standard units.

(j). Prompt: Logbook Page Number?
########
Response: Enter logbook page number.

(k). Prompt: Weather?
####################
Response: Scan weather.

I. Prompt: Preserved pH?
##
Response: Scan preserved pH. Must be 1-14 or blank.

J. Prompt: Date is ddmmmyyyy
Change Sample Date
(Y) or (N) ?
#
Response: This is a pivotal field for the transaction.

1. If “N” is entered, the sample date is accepted as displayed.

2. If “Y” is entered, then

Prompt: Sample/Analysis Date
Month?
##
Response: Enter two-character numeric month.

Prompt: Day?
##
Response: Enter two-character numeric day.

Prompt: Year?
####
Response: Enter four-character numeric year.

K. Prompt: Sample/Analysis Time
Hour?
##
Response: Enter military hour (0 - 23).

Prompt: Minute?
##
Response: Enter minute (00 - 59). A WS transaction is written at this time. If baseflow field measurement was taken, a BF transaction is written. The program returns to Scan Sample ID prompt.